LONDON-WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA9 | Central Chilterns

Operational assessment (SV-004-009)

Sound, noise and vibration

November 2013

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Department for Transport

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Appendix SV-004-009

Environmental topic:	Sound, noise and vibration	SV
Appendix name:	Operation assessment	004
Community forum area:	Central Chilterns	009

Contents

List of tables

1 Introduction

1.1 Structure of the sound, noise and vibration appendices

1.1.1 The sound, noise and vibration appendices comprise four sections. The first of these details the methodology used (Appendix SV-001-000) and relates to the sound, noise and vibration assessment for all community forum areas (CFA).

1.1.2 For the Central Chilterns community forum area (CFA09), the other three sections are as follows:

- baseline sound, noise and vibration (Appendix SV-002-009);
- construction sound, noise and vibration (Appendix SV-003-009); and
- operational sound, noise and vibration (Appendix SV-004-009) (this appendix).

1.1.3 The outcomes of this assessment are summarised in Volume 2: CFA09 Report, Chapter 11 Sound, Noise and Vibration.

1.1.4 Maps referred to throughout the sound, noise and vibration appendices are contained in the Volume 5 sound, noise and vibration map book.

1.1.5 This appendix presents the likely noise and vibration impacts, effects and significant effects arising from the operation of the Proposed Scheme for the Central Chilterns area on:

- people, primarily where they live ('residential receptors') in terms a) individual dwellings and b) on a wider community basis, including any shared community spaces; and
- community facilities such as schools, hospitals, places of worship, and also commercial properties such as offices and hotels, collectively described as 'non-residential receptors' and 'quiet areas'.

1.1.6 The assessment of likely impacts, effects and significant effects from operational noise and vibration on agricultural, community, ecological or heritage receptors and the assessment of tranquillity are presented in the following documents within Volume 5:

- Agriculture, forestry and soils — Appendix AG-001-009
- Community — Appendix CM-001-009
- Ecology — Appendix EC-005-002
- Heritage — Appendix CH-003-009
- Landscape and Visual — Appendix LV-001-009

1.2 Evaluation of impacts and effects

1.2.1 This appendix provides a quantitative assessment of operational noise and vibration impacts and effects and a qualitative assessment of likely significant effects, based on the impacts and effects identified and other local context information consistent with the scope and methodology defined for the Proposed Scheme.

1.2.2 Indirect effects arising from permanent changes in traffic patterns on the existing road and rail networks as a consequence of the Proposed Scheme are also reported in this appendix, where they would occur within the study area as defined in Volume 5: Appendix SV-001-000.

1.2.3 Route-wide impacts, effects and significant effects associated with noise or vibration from the operation of the Proposed Scheme are reported in Volume 3.

1.2.4 Off-route effects of noise or vibration arising from the operation of the Proposed Scheme, including those likely to arise from permanent changes in traffic patterns on roads or railways outside of the study area for direct effects are reported in Volume 4.

1.2.5 In undertaking the assessment of sound, noise and vibration, consistent with EIA Regulations and emerging National Planning Practice Guidance[1] a differentiation between impacts effects, adverse effects and significant effects is made. Further information is provided in Volume 5: Appendix SV001-000.

1.2.6 The assessment of impacts has been undertaken at assessment locations that are representative of a number of dwellings or other sensitive receptors. The Assessment Locations employed in this assessment are presented on map series Sv-02 in the CFA09 Volume 5 sound, noise and vibration map book.

[1] National Planning Practice Guidance – Noise http://planningguidance.planningportal.gov.uk ; refer to the table summarising noise exposure hierarchy

2 Scope, assumptions and limitations

2.1 Regional and local policy guidance

2.1.1 The policy framework for sound, noise and vibration is set out in Volume 1 and in Appendix SV-001-000. As part of the engagement with local authorities through the Planning Forum Sub Group (Acoustics), information regarding any specific local planning guidance in respect of noise and vibration has been requested. Whilst no information has been received for this study area via the Planning Forum Sub Group (Acoustics) the following local policy guidance on noise and vibration has been identified:

- Chiltern District Council Local Plan - Consolidated September 2007 & November 2011

2.1.2 This guidance has been considered as part of formulating the detailed application of the impact and significance criteria set out in Volume 5: Appendix SV-001-000.

2.2 Engagement

2.2.1 Details of engagement on a route-wide basis with the local and county authorities' Environmental Health Practitioners via the Planning Forum Sub Group - Acoustics, is set out in Volume 1, Section 8.

2.2.2 Engagement with communities has been via the Community Forums, as set out in Volume 1. In respect of sound, noise and vibration the following discussions have taken place:

- general discussions in respect of local issues, including possible ways to avoid and mitigate the potential impacts of noise or vibration
- September / October 2012; a specific presentation about sound, noise and vibration with discussion afterwards with one of the project team specialists;
- November / December 2012; specific request for the Community Forum to propose baseline sound monitoring locations;
- January / February 2013; feedback to the Community Forum on any proposed baseline monitoring locations; and
- verbal / written response to questions on sound, noise and vibration.

2.3 Methodology

2.3.1 The methodology used for the assessment of airborne sound, ground-borne sound and vibration impacts and the determination of significant effects is defined in the Scope and Methodology Report (SMR) (Volume 5: Appendix CT-001-000/1), is clarified in a number of areas by the SMR addendum (Volume 5: Appendix CT-001-000/2). Further information is contained in Volume 5: Appendix SV-001-000.

2.4 Assumptions

2.4.1 Route-wide assumptions are outlined in Volume 1, Section 8, and are further detailed in Volume 5: Appendix SV-001-000. Local assumptions that apply to the assessment of operational sound noise and vibration within this CFA are set out in Volume 2: Report 09.

2.5 Limitations

2.5.1 In this area, there are a number of locations where the land or property owners did not permit baseline sound level monitoring to be undertaken at their premises. However, sufficient information has been obtained to undertake the assessment. Further information is provided in Volume 5: Appendix SV-002-009.

3 Environmental baseline

3.1 Existing baseline

3.1.1 Baseline sound level data has been collected at locations representative of the airborne sound-sensitive receptors. The existing and future baseline airborne sound levels derived from these measurements are included within Table 3. Details of the baseline data collection and the methodology are given in Volume 5: Appendix SV-001-000 and specifically for this study area in Volume 5: Appendix SV-002-009.

3.1.2 The majority of receptors adjacent to the line of the route are not currently subject to appreciable vibration and therefore vibration at all receptors has been assessed using the absolute vibration criteria as described in Volume 5: Appendix SV-001-000.

3.2 Future baseline

3.2.1 The assessment is based upon the predicted change in sound levels that result from the Proposed Scheme. The assessment initially considered a worst case (that would overestimate the change in levels) by assuming that sound levels would not change from the existing baseline year of 2012/2013. Where significant effects were identified on this basis, the effects have been assessed using the baseline year of 2026 to coincide with the proposed start of passenger services. The future baseline is for the sound environment that would exist in 2026 without the Proposed Scheme.

4 Effects arising during operation

4.1 Introduction

4.1.1 The assessment is reported first for ground-borne sound and vibration and then for airborne sound. Under each of these headings, the results of the quantitative identification of impacts and effects are presented. This is followed by the identification of significant effects and the evidence used to support these conclusions.

4.1.2 The structure of this assessment report is:

- Avoidance and mitigation measures
- Quantitative identification of impact and effects
  - Ground-borne sound and vibration
    - Residential
    - Non-residential
  - Airborne sound
    - Residential
    - Non-residential
- Assessment of impacts and effects
  - Residential receptors: direct effects – dwellings
  - Residential receptors: direct effects – communities
  - Residential receptors: indirect effects
  - Non-residential receptors: direct effects
  - Non-residential receptors: indirect effects
  - Cumulative effects from the proposed scheme and other committed development.

4.2 Avoidance and mitigation measures

4.2.1 These are set out in Volume 2: Report 9.

4.3 Quantitative identification of impacts and effects

Ground-borne sound and vibration

4.3.1 Assessment locations defined for the quantitative assessment of impacts are shown on map series SV-02 in the CFA09 Volume 5 sound, noise and vibration map book.

4.3.2 For each Assessment Location, the assessment results for residential and non-residential receptors are presented in Table 1. Explanation of the information in Table 1 is provided in Appendix SV-001-000, with the following additional notes.

B	For non-residential receptors further detail about the type of effect is set out in the text of Volume 5: Appendix SV-001-000.
NA	Type of effect - Generally no adverse effect
A	Type of effect - Adverse effect
S	Type of effect - Significant adverse effect
VDV	Vibration Dose Value
~	The forecast adverse effects are not considered to be significant on a community basis (further information on methodology is provided in Volume 5: Appendix SV-001-000).
^	The impact methodology has identified a potential significant effect at this receptor which based upon further qualitative information is not considered to be a likely significant effect. Please refer the end of this Appendix for further information.
	Where the significant effect column is highlighted in pink, then a significant effect is identified at the referenced residential community area, or individual receptor.
	Yellow denotes a low ground-borne noise impact or a minor ground-borne vibration impact
	Orange denotes a medium ground-borne noise impact or a moderate ground-borne vibration impact
	Red denotes a high ground-borne noise impact or a major ground-borne vibration impact
	Dark red denotes a very high ground-borne noise impact

Table 1: Ground-borne sound and vibration levels, noise and vibration impacts and effects

Assessment location		Impact criteria				Significance criteria								
ID	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 - 23:00)	VDV m/s$^{1.75}$ Night time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	Significant effect
376359	Hyde Lane, Hyde End	-	0.11	0.05	-	1	NA	R	-	-	-	-	-	-
622061	Chalk Lane, Hyde Heath	24	0.06	0.04	-	1	NA	R	-	-	-	-	-	-
622063	Chalk Lane, Hyde Heath	18	0.04	0.02	-	1	NA	R	-	-	-	-	-	-

Impact summary

4.3.3 The operational ground-borne noise and vibration impacts identified in Table 1 are summarised in Table 2.

Table 2: Summary of operational ground-borne noise and vibration impacts

	Number of ground-borne sound impacts			
	Low	Medium	High	Very High
Residential properties	1	0	0	0
Non-residential properties	0			0
	Number of ground-borne vibration impacts			
	Minor	Moderate	Major	Risk of building damage
Residential properties	0	0	0	0

Airborne sound: direct impacts and effects

4.3.4 The direct effects from the operation of the Proposed Scheme as well as any new, amended or altered roads or railway lines, which are identified as part of the scheme, are presented in Table 3.

4.3.5 The assessment information, impact criteria and significance criteria for the assessment of the incorporated mitigation case at residential and non-residential receptors are presented in Table 3. The results should be considered in conjunction with the information contained in map series Sv-02 in the CFA09 Volume 5 sound, noise and vibration map book.

4.3.6 Explanation of the Table 3 information is provided in Appendix 5: SV-001-000, with the following additional notes.

	Where the significant effect column is marked, then a significant effect is identified at the referenced group of dwellings, or individual residential or non-residential receptor.
	Yellow denotes a minor impact at a residential building – a change is of 3-5 dB
	Orange denotes a moderate impact at a residential building – a change is of 5-10 dB
	Red denotes a major impact at a residential building – a change is of >10 dB
*	Day - $L_{pAeq,07:00-23:00}$
**	Night - $L_{pAeq,23:00-07:00}$
***	Max - L_{pAFmax} In the Proposed Scheme only column, two values are presented. The first is the value for the HS2 mitigated train and the second is the value for the TSI compliant train. For further information refer to Volume 5: Appendix SV-001-000.
****	Where the Proposed Scheme modifies an existing source, i.e. road or railway realignments, the *Proposed Scheme only* level in the table includes the sound from the modified source. In this situation the *Do something (Opening year baseline + Year 15 traffic)* level has been corrected so as to not double count the sound associated with the road or railway on its new and existing alignment.
A	Adverse effect
B	For non-residential receptors further detail about the type of effect is set out in the text of Appendix SV-001-000.
CD	Committed Development. The value in brackets in the number of impacts represented column is the value with the committed development.

G	(G1)Theatres, large auditoria and concert halls, (G2) Sound recording and broadcast studios, (G3) Places of meeting for religious worship, courts, cinemas, lecture theatres, museums and small auditoria or halls, (G4) Schools, colleges, hospitals, hotels and libraries, and (G5) Offices and general commercial premises
H	High existing ambient sound level. Defined as >65dB$L_{Aeq,\ day}$ and/or >55dB$L_{Aeq,\ night}$
L	Low existing ambient sound level. Defined as <42dB$L_{Aeq,\ day}$ and/or <32dB$L_{Aeq,\ night}$
LD	Landscape receptor
NA	Generally no adverse effect
NI	The receptor is predicted to qualify for mitigation, which shall be provided to the specification defined in the Noise Insulation (Railways and other Guided Rail Systems) Regulations 1996
R	Residential
RM	Residential mooring
S	Significant adverse effect
U	Unacceptable adverse effect
#	A change of 3dB or greater has been identified however, the assessment methodology only defines an impact where the absolute sound level from the Proposed Scheme is greater or equal to 50 dB $L_{pAeq,\ 23:00-07:00}$ during the daytime or 40 dB $L_{pAeq,\ 07:00-23:00}$ at night. At the receptor denoted the absolute level condition is not met and therefore no impact is identified.
~	The forecast adverse effects are not considered to be significant on a community basis (further information on methodology is provided in Volume 5: Appendix SV-001-000)..
$	A change of 3dB or greater has been identified however, the impact methodology for non-residential receptors includes a screening criteria for G3 building use of 50 dB $L_{pAeq,07:00-23:00,}$ for G4 building use 55 dB $L_{pAeq,07:00-23:00}$ and 45 dB $L_{pAeq,23:00-07:00}$, for G5 building use 55 dB $L_{pAeq,07:00-23:00}$. At the receptor denoted the screening criteria is not met and therefore no impact is identified. Further information is provided in Volume 5: Appendix SV-001-000.
^	The impact methodology has either identified an impact at a receptor which based upon further qualitative information does not gives rise to a significant effect. Further information is provided at the end of this Appendix.

Table 3: Operational airborne sound level, noise impacts and effects

Assessment Location		Impact criteria									Significance criteria								
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	Significant effect
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
351444	Aylesbury Road, Great Missenden	39	29	54/57	52	40	62	52	40	0	0	NA	2	R	T	-	-	-	-	
351452	Aylesbury Road, Great Missenden	41	31	56/59	62	50	62	62	50	0	0	NA	2	R	T	-	-	-	-	
351515	Aylesbury Road, Great Missenden	47	37	59/62	53	47	90	54	47	1	0	NA	2	R	T	-	-	-	-	
353672	Church Street, Great Missenden	31	22	44/47	62	50	62	62	50	0	0	NA	1	R	T	-	-	-	-	
354579	Elmtree Green, Great Missenden	33	24	47/50	53	41	62	53	41	0	0	NA	18	R	T	-	-	-	-	
354872	Frith Hill, Great Missenden	36	27	53/56	51	45	52	51	45	0	0	NA	2	R	T	-	-	-	-	
355246	Aylesbury Road, Great Missenden	37	28	52/55	62	50	62	62	50	0	0	NA	4	R	T	-	-	-	-	
355252	Aylesbury Road, Great Missenden	41	31	56/59	51	40	62	51	40	0	1	NA	1	R	T	-	-	-	-	
355317	Potter Row, Great Missenden	51	42	64/66	46	43	68	52	45	6	2	A	1	R	T	-	-	-	-	OSV09-C02
355352	Potter Row, Great Missenden	53	44	63/66	46	39	68	54	45	8	6	A	2	R	T	-	-	-	-	OSV09-C02
373949	Hyde Lane, Hyde End	47	38	67/70	47	41	48	50	42	3	2	NA	1	R	T	-	-	-	-	#
374004	Hyde End, Great Missenden	35	26	49/52	47	41	48	47	41	0	0	NA	3	R	T	-	-	-	-	
374188	Ballinger Road, South Heath	37	28	54/57	51	41	46	52	41	0	0	NA	13	R	T	-	-	-	-	
374262	Meadow Lane, South Heath	38	29	56/58	47	40	47	47	40	0	0	NA	6	R	T	-	-	-	-	
374450	Frith Hill, Great Missenden	34	26	47/50	47	41	48	47	41	0	0	NA	1	R	T	-	-	-	-	

Assessment Location		Impact criteria									Significance criteria								
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	Significant effect
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
374515	Frith Hill, Great Missenden	37	28	55/58	51	45	52	51	45	0	0	NA	3	R	T	-	-	-	-	
374531	Chesham Road, Great Missenden	45	38	56/58	55	48	76	55	48	0	0	NA	1	R	T	-	-	-	-	
374552	Cudsdens Court, Great Missenden	56	49	61/64	56	50	76	56	49	0	0	A	6	R	T	-	-	-	-	
374611	Frith Hill, Great Missenden	40	31	58/60	51	45	52	51	45	0	0	NA	3	R	T	-	-	-	-	
374641	Frith Hill, South Heath	40	31	59/62	51	45	52	51	45	0	0	NA	4	R	T	-	-	-	-	
374696	Frith Hill, South Heath	47	38	66/69	47	41	50	50	43	3	2	NA	3	R	T	-	-	-	-	#
374715	Frith Hill, South Heath	50	42	67/70	57	50	50	58	51	1	0	A	1	R	T	-	-	-	-	
374775	Sibleys Rise, South Heath	44	37	63/66	47	40	47	47	40	1	0	NA	19	R	T	-	-	-	-	
374806	Kings Lane, South Heath	44	36	60/62	47	41	40	48	41	1	0	NA	8	R	T	-	-	-	-	
374849	Bayleys Hatch, South Heath	47	39	66/69	50	41	63	51	42	1	1	NA	6	R	T	-	-	-	-	
374914	Sibleys Rise, South Heath	43	35	65/68	47	40	47	48	40	1	1	NA	25	R	T	-	-	-	-	
375025	Kings Lane, South Heath	41	33	62/65	48	41	49	48	41	1	0	NA	8	R	T	-	-	-	-	
375067	Lappetts Lane, South Heath	37	30	53/56	48	41	49	48	41	0	0	NA	5	R	T	-	-	-	-	
375134	Kings Lane, South Heath	42	34	61/64	47	41	40	48	41	1	0	NA	10	R	T	-	-	-	-	
375214	Bayleys Hatch, South Heath	45	37	66/69	48	44	44	49	44	2	1	NA	10	R	T	-	-	-	-	
375322	Potter Row, Great Missenden	49	40	67/69	44	39	46	50	42	6	3	A	5	R	T	-	-	-	-	~
375417	Potter Row, Great Missenden	43	34	64/67	48	41	49	49	42	1	1	NA	6	R	T	-	-	-	-	
375440	Potter Row, Great Missenden	44	35	58/60	46	36	47	48	38	2	2	NA	1	R	T	-	-	-	-	
375451	Potter Row, Great Missenden	43	34	58/61	46	36	47	48	38	2	2	NA	1	R	T	-	-	-	-	
375485	Potter Row, Great Missenden	54	44	67/70	50	45	51	55	48	5	3	A	3	R	T	-	-	-	-	OSV09-C02

Assessment Location		Impact criteria										Significance criteria								
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	Significant effect
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
375495	Potter Row, Great Missenden	51	42	64/66	44	39	46	52	44	8	5	A	1	R	T	-	-	-	-	OSV09-C02
375508	Potter Row, Great Missenden	49	40	64/66	46	36	47	51	41	5	5	A	3	R	T	-	-	-	-	OSV09-C02
375545	Potter Row, Great Missenden	47	38	60/62	46	36	47	50	40	4	4	NA	1	R	T	-	-	-	-	#
375619	Potter Row, Great Missenden	47	38	59/62	44	39	46	49	41	5	2	NA	2	R	T	-	-	-	-	#
375630	Potter Row, Great Missenden	53	44	65/67	44	39	46	53	45	9	6	A	1	R	T	-	-	-	-	OSV09-C02
375648	Potter Row, Great Missenden	50	40	62/65	46	36	47	51	42	5	6	A	4	R	T	-	-	-	-	OSV09-C02
375669	Potter Row, Great Missenden	49	39	61/64	51	50	50	53	51	2	0	NA	5	R	T	-	-	-	-	
376239	Hyde Lane, Hyde End	57	48	74/77	48	44	50	58	49	10	6	A	1	R	T	-	-	-	-	OSV09-C01
376310	Hyde Lane, Hyde End	56	46	69/73	48	44	50	56	48	8	4	A	2	R	T	-	-	-	-	OSV09-C01
376359	Hyde Lane, Hyde End	67	58	82/85	46	35	41	67	58	22	23	S	1	R	T	-	-	-	NI	OSV09-C01 OSV09-D01
376368	Hyde Lane, Hyde End	57	48	70/73	46	35	41	57	48	11	12	A	1	R	T	-	-	-	-	OSV09-C01
376399	Chesham Road, Hyde End	52	43	68/71	47	41	48	52	44	6	3	A	1	R	T	-	-	-	-	OSV09-C01
376478	Chesham Road, Hyde End	53	44	67/70	54	46	77	53	44	0	-2	A	1	R	T	-	-	-	-	
376498	Chesham Road, Hyde End	48	40	62/65	58	51	77	55	48	-3	-3	A	1	R	T	-	-	-	-	
376517	Chesham Road, Hyde End	46	38	61/64	55	47	77	55	48	0	0	NA	1	R	T	-	-	-	-	
376522	Chesham Road, Hyde End	43	35	57/60	63	54	63	63	54	0	0	NA	7	R	T	-	-	-	-	
376647	Chesham Road, Hyde End	44	36	57/60	58	49	63	58	49	0	0	NA	2	R	T	-	-	-	-	
376658	Chesham Road, Hyde End	42	33	56/59	63	54	63	63	54	0	0	NA	2	R	T	-	-	-	-	
376681	Kings Lane, South Heath	41	36	57/59	51	46	51	41	36	-10	-10	NA	1	R	T	-	-	-	-	
376704	Kings Lane, South Heath	45	38	56/58	47	41	40	47	40	0	0	NA	10	R	T	-	-	-	-	
376750	Kings Lane, South Heath	40	33	55/58	48	41	49	48	41	0	0	NA	9	R	T	-	-	-	-	

Assessment Location		Impact criteria										Significance criteria								Significant effect
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
377005	Wood Lane, South Heath	42	35	51/54	47	40	47	46	39	-1	-1	NA	9	R	T	-	-	-	-	
377084	Lappetts Lane, South Heath	38	30	56/59	47	40	47	47	40	0	0	NA	20	R	T	-	-	-	-	
377405	Wood Lane, South Heath	46	40	56/59	46	41	51	46	40	0	0	A	16	R	T	-	-	-	-	
377718	Ballinger Road, South Heath	36	28	53/56	51	41	46	51	41	0	0	NA	14	R	T	-	-	-	-	
377770	Ballinger Road, South Heath	34	26	50/52	51	41	46	51	41	0	0	NA	15	R	T	-	-	-	-	
377793	Marriotts Avenue, South Heath	36	28	53/55	46	39	47	46	39	0	0	NA	17	R	T	-	-	-	-	
377835	Marriotts Avenue, South Heath	35	27	52/55	46	39	47	46	39	0	0	NA	18	R	T	-	-	-	-	
378065	Ballinger Road, South Heath	32	24	48/50	51	41	46	51	41	0	0	NA	22	R	T	-	-	-	-	
379212	Bullbaiters Lane, Hyde Heath	36	27	54/56	46	39	47	46	39	0	0	NA	8	R	T	-	-	-	-	
379334	Hyde Heath, Amersham	35	26	51/53	48	42	47	48	42	0	0	NA	4	R	T	-	-	-	-	
379370	Top Common, Hyde End	38	30	52/55	47	41	48	47	41	1	0	NA	3	R	T	-	-	-	-	
379436	Chesham Road, Hyde End	40	31	56/59	49	43	50	50	43	1	0	NA	9	R	T	-	-	-	-	
379500	Browns Road, Hyde End	39	31	53/55	49	43	50	50	43	0	0	NA	1	R	T	-	-	-	-	
379633	Browns Road, Hyde End	41	33	54/56	49	43	50	50	43	1	0	NA	5	R	T	-	-	-	-	
379730	Brays Lane, Hyde Heath	30	21	48/51	53	48	54	53	48	0	0	NA	82	R	T	-	-	-	-	
380955	Chalk Lane, Hyde Heath	45	36	64/66	49	41	50	50	42	1	1	NA	4	R	T	-	-	-	-	
382171	Chalk Lane, Hyde Heath	31	25	47/49	49	41	50	49	41	0	0	NA	2	R	T	-	-	-	-	
382210	Chalk Lane, Little Missenden	32	24	50/53	49	41	50	49	41	0	0	NA	1	R	T	-	-	-	-	
382291	Brays Close, Hyde Heath	32	24	48/50	48	39	47	48	39	0	0	NA	61	R	T	-	-	-	-	
382388	Chalk Lane, Hyde Heath	29	22	47/49	49	41	50	49	41	0	0	NA	10	R	T	-	-	-	-	
382636	Chalk Lane, Hyde Heath	29	21	45/47	48	39	47	48	39	0	0	NA	17	R	T	-	-	-	-	

Assessment Location		Impact criteria										Significance criteria								Significant effect
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
700359	Aylesbury Road, Great Missenden	49	40	61/64	52	46	90	54	47	2	1	A	0	R	T	-	-	-	-	
700360	Potter Row, Great Missenden	51	41	64/67	44	39	46	52	43	7	4	A	1	R	T	-	-	-	-	OSV09-C02
351515	Aylesbury Road, Great Missenden, (Office)	47	37	59/62	53	47	90	54	47	1	0	B	1	G5	T	-	-	-	-	
353672	Great Missenden Church Of England Combined School, Church Street (School)	31	22	44/47	62	50	62	62	50	0	0	B	1	G4	T	-	-	-	-	
354872	Frith Hill, Great Missenden, (Stables)	36	27	53/56	51	45	52	51	45	0	0	B	1	G5	T	-	-	-	-	
376647	Middlegrove Farm, Chesham Road (General Commercial)	44	36	57/60	58	49	63	58	49	0	0	B	1	G5	T	-	-	-	-	
377770	Post Office, Ballinger Road, South Heath, (Post Office)	34	26	50/52	51	41	46	51	41	0	0	B	1	G5	T	-	-	-	-	
379730	Hyde Heath Village Hall, Hyde Heath (Hall)	30	21	48/51	53	48	54	53	48	0	0	B	1	G3	T	-	-	-	-	
379730	Hyde Heath, (General Commercial)	30	21	48/51	53	48	54	53	48	0	0	B	1	G5	T	-	-	-	-	
379730	Hyde Heath Chapel, Hyde Heath (Chapel)	30	21	48/51	53	48	54	53	48	0	0	B	1	G4	T	-	-	-	-	
379730	Rayners Care Home Hyde Heath, (Care Home)	30	21	48/51	53	48	54	53	48	0	0	B	1	G3	T	-	-	-	-	

Direct impact - Summary

4.3.7 The operational airborne noise impacts identified in Table 3 are summarised in Table 4.

Table 4: Summary of operational airborne sound impacts

Receptor	Number of impacts		
	Minor	Moderate	Major
Residential properties	0	24	3
Non-residential properties	0	0	0
Quiet areas	None	None	None

4.4 Assessment of impacts and effects

Residential receptors: direct effects - individual buildings

4.4.1 Taking account of the avoidance and mitigation measures incorporated into the Proposed Scheme, the assessment has identified one residential dwelling, Sheepcotts Cottage in Hyde Lane, Hyde Heath represented by receptor reference 376359 (marked as OSV09-D01) located close to the Proposed Scheme, where noise would exceed the daytime trigger threshold set in the Regulations. It is therefore estimated that this building is likely to qualify for noise insulation under the Regulations. This dwelling is indicated on Volume 5: Map Book - Sound, noise and vibration, Map series SV-02.

4.4.2 The mitigation measures including noise insulation will reduce noise inside all dwellings, including Sheepcotts Cottage, such that it will not reach a level where it would significantly affect residents.

Residential receptors: direct effects –communities

4.4.3 The mitigation measures in this area will avoid airborne noise adverse effects on the majority of receptors, and at the following residential communities:

- South Heath (except as identified in Table 5);
- Hyde End (except as identified in Table 5);
- Little Missenden; and
- Great Missenden.

4.4.4 Taking account of the envisaged mitigation, Map Series SV-05 (Volume 2 Map book) shows the long term 40dB[2] night-time sound level contour from the operation of trains on the Proposed Scheme. The extent of the 40dB night-time sound level contour is equivalent to, or slightly larger than, the 50dB daytime contour[3]. In general, below these levels adverse effects are not expected.

4.4.5 Above 40dB during the night and 50dB during the day the effect of noise is dependent on the baseline sound levels in that area and the change in sound level (magnitude of effect) brought about by the Proposed Scheme. The airborne noise impacts and effects forecast for the operation of the scheme are presented on Map Series SV-05 (Volume 2 Map Book).

4.4.6 Approximately five isolated properties within the area have been identified as being subject to an observed adverse noise effect; these effects are likely to be considered as an effect on the acoustic character of the area such that there is a perceived change in the quality of life. However, as the affected properties are spatially remote from larger defined residential areas, are subject to smaller magnitudes of noise effect, or are small in number, the effects are not considered to be significant.

4.4.7 The changes in noise levels are likely to affect the acoustic character of the area such that there is a perceived change in the quality of life and are considered to be significant when assessed on a community basis[4] taking account of the local context as identified in Table 5.

Table 5: Direct adverse effects on residential communities and shared open areas that are considered significant on a community basis

Significant effect number (see Map series SV-02, Table 1 and 3)	**Source of significant effect**	**Time of day**	**Location and details**
OSV09-C01	Airborne noise increase from new train services	Daytime and night-time	Hyde End: approximately five dwellings in the vicinity of Hyde Lane. Forecast increases in sound from the railway are likely to cause a major adverse effect on the acoustic character of the area around the closest properties. The effect on the acoustic character of residential areas that are located further from the railway would be moderate. There are no shared open spaces identified as being affected in this community area.
OSV09-C02	Airborne noise increase from new train services	Daytime and night-time	South Heath: approximately 10 dwellings in the vicinity of Potters Row. Forecast increases in sound from the railway are likely to cause a moderate adverse effect on the acoustic character of the area. There are no shared open spaces identified as being affected in this community area.

[2] Defined as the equivalent continuous sound level from 23:00 to 07:00 or $L_{pAeq,night}$)

[3] With the train flows described in the assumptions section of this CFA Report, the daytime sound level (defined as the equivalent continuous sound level from 07:00 to 23:00 or $L_{pAeq,day}$) from the Proposed Scheme would be approximately 10dB higher than the night-time sound level. The 40dB contour therefore indicates the distance from the Proposed Scheme at which the daytime sound level would be 50dB.

[4] Further information is contained in Volume 1.

Residential receptors: indirect effects

4.4.8 The transport assessment presented in Volume 5: Appendix TR-001-000, has been used to identify those roads or railways within this study area where the alignment remains as at present, but a change in flow or composition is identified which is greater than the screening criteria defined in Volume 5: Appendix SV-001-000. No roads or railways which exceed the criteria defined in Volume 5: Appendix SV-001-000 have been identified in this study area.

4.4.9 The assessment of operational noise and vibration indicates that significant indirect effects on residential receptors are unlikely to occur in this area.

Non-residential receptors: direct effects

4.4.10 The assessment of operational noise and vibration indicates that significant direct effects on non-residential receptors are unlikely to occur in this area.

Non-residential receptors: indirect effects

4.4.11 The transport assessment presented in Volume 5: Appendix TR-001-000, has been used to identify those roads or railways within this study area where the alignment remains as at present, but a change in flow or composition is identified which is greater than the screening criteria defined in Volume 5: Appendix SV-001-000. No roads or railways which exceed the criteria defined in Volume 5: Appendix SV-001-000 have been identified in this study area.

4.4.12 The assessment of operational noise and vibration indicates that significant indirect effects are unlikely to occur on non-residential receptors in this area.

Cumulative effects

4.4.13 Details of properties being currently developed which were afforded planning approval before the safeguarding date are presented in Volume 5: Appendix CT004-000. Within this area, the operational sound, noise or vibration associated with these developments in conjunction with the operation of the Proposed Scheme do not result in any significant cumulative effects.